

Fig. 1

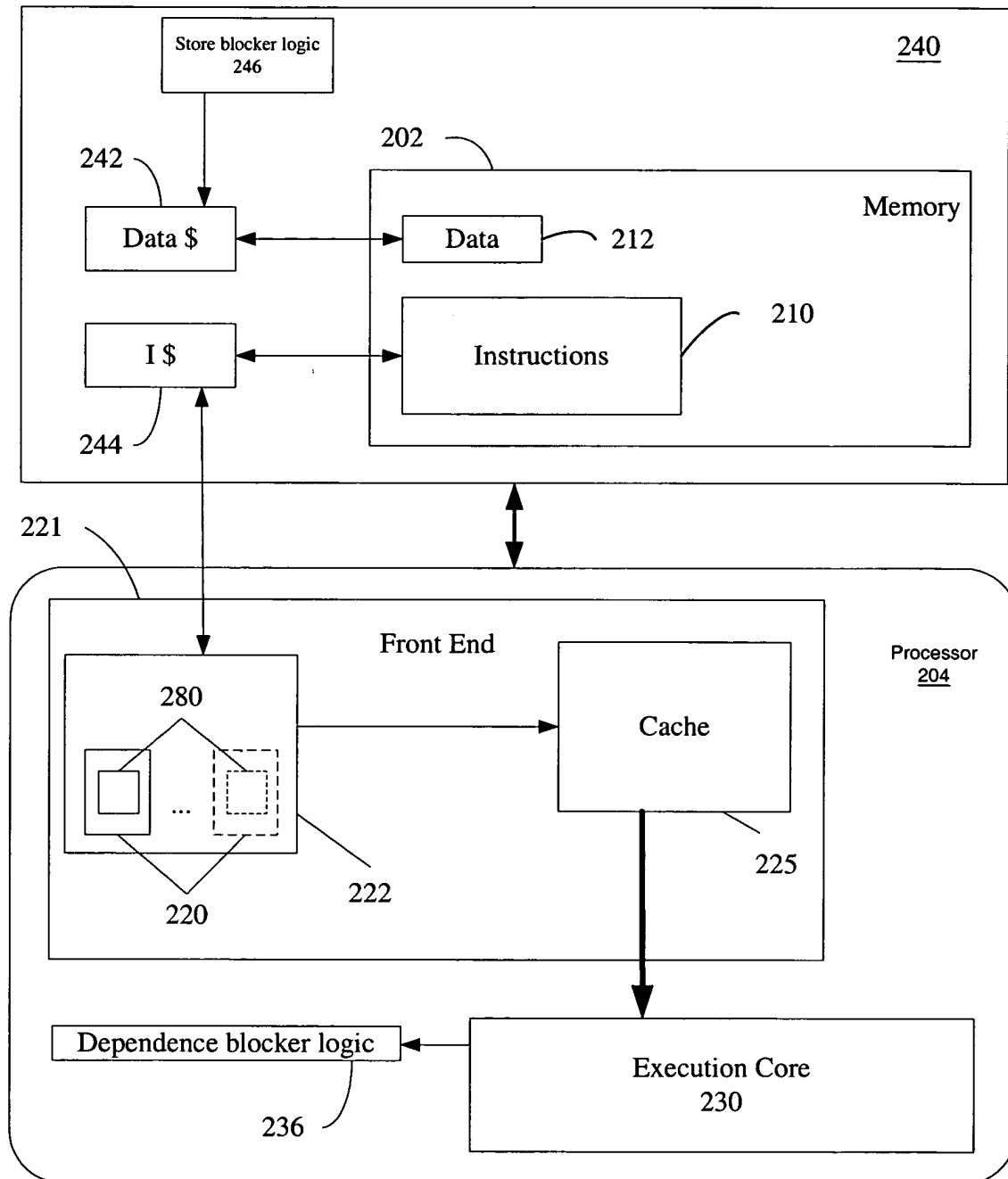


Fig. 2

300

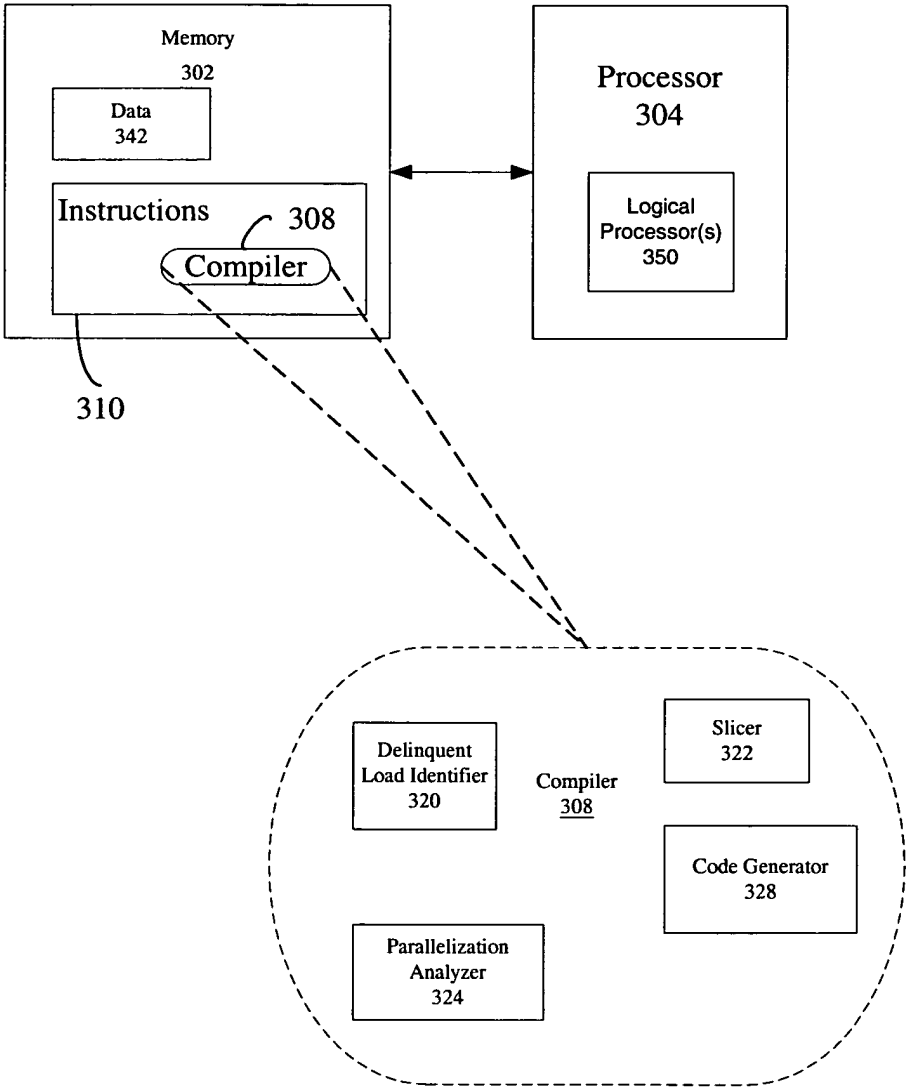


Fig. 3

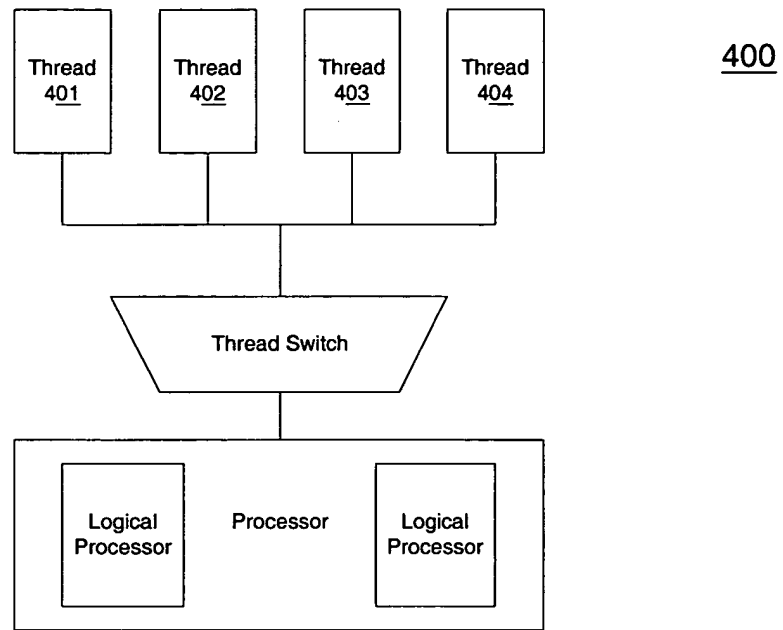


Fig. 4A
(Prior Art)

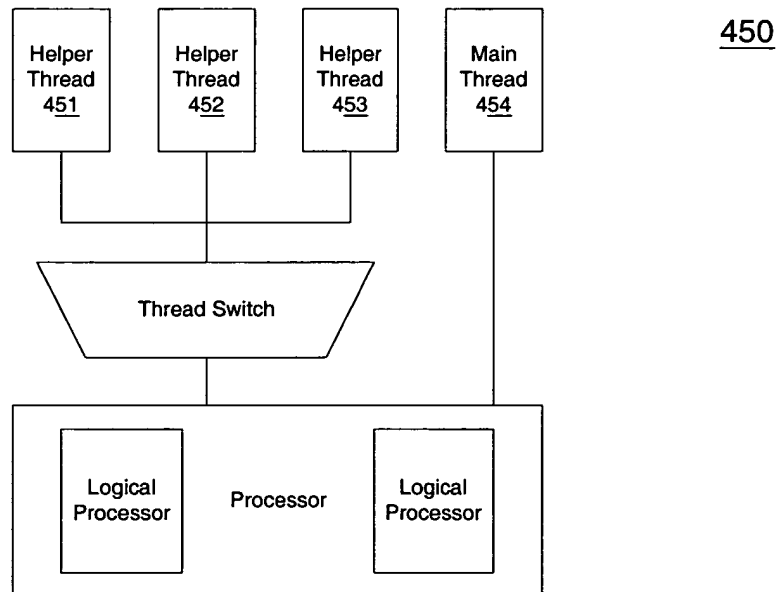


Fig. 4B

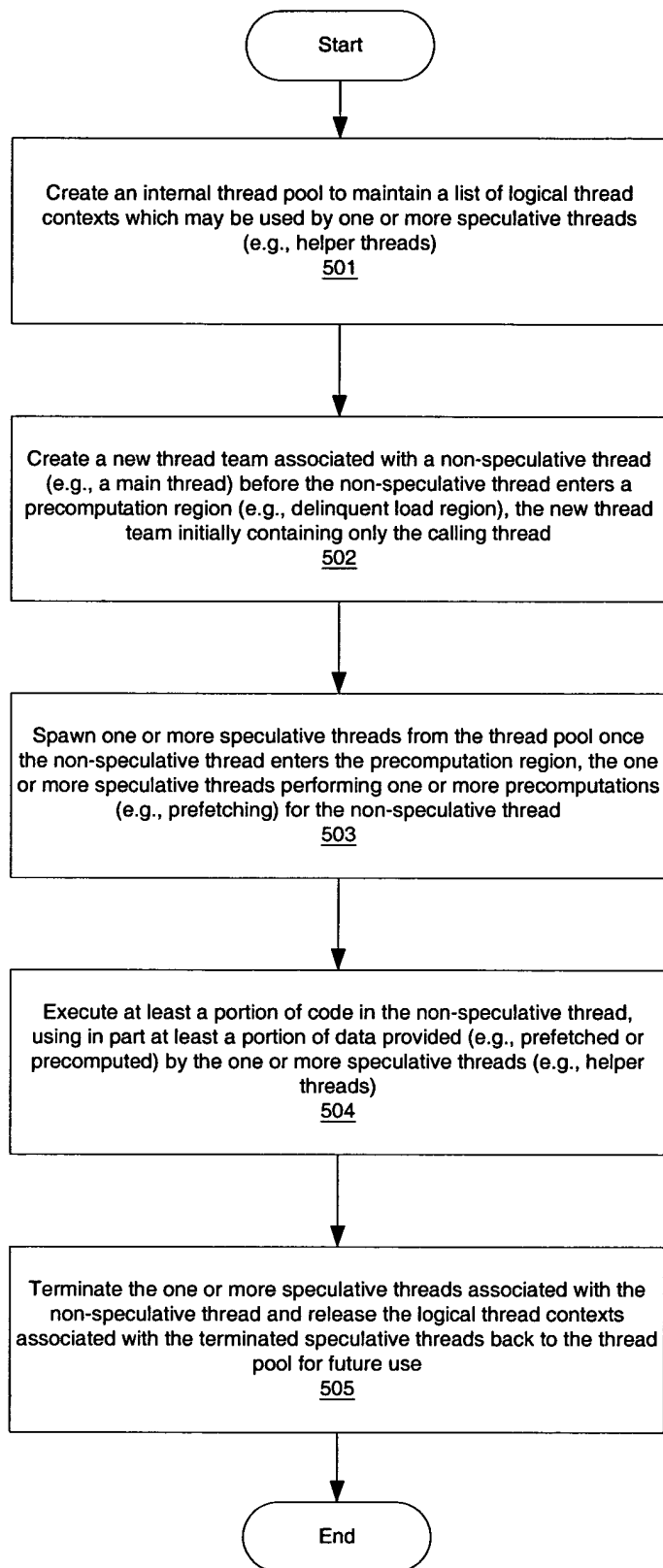
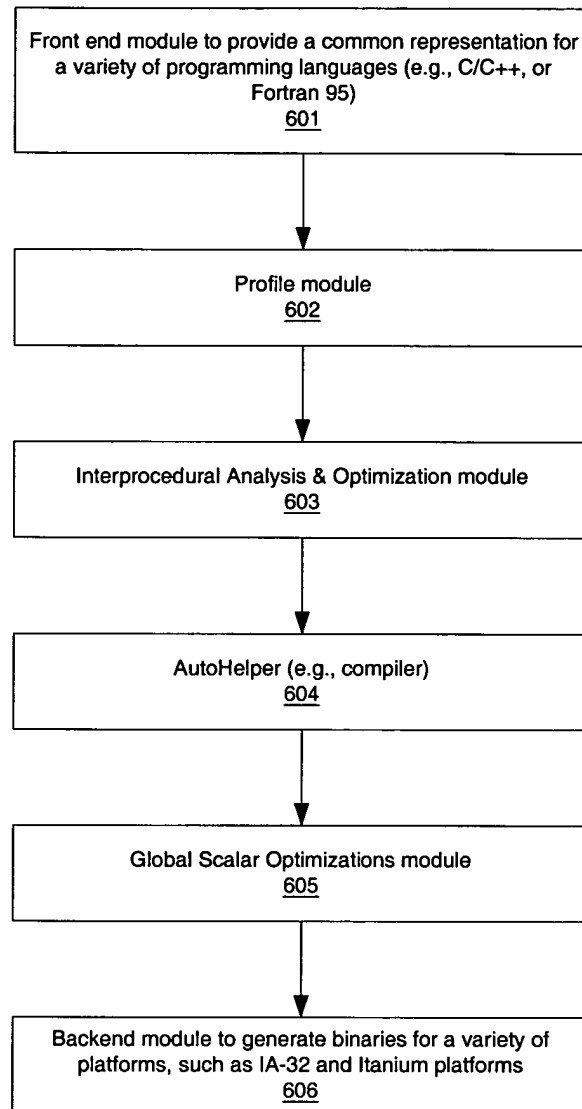
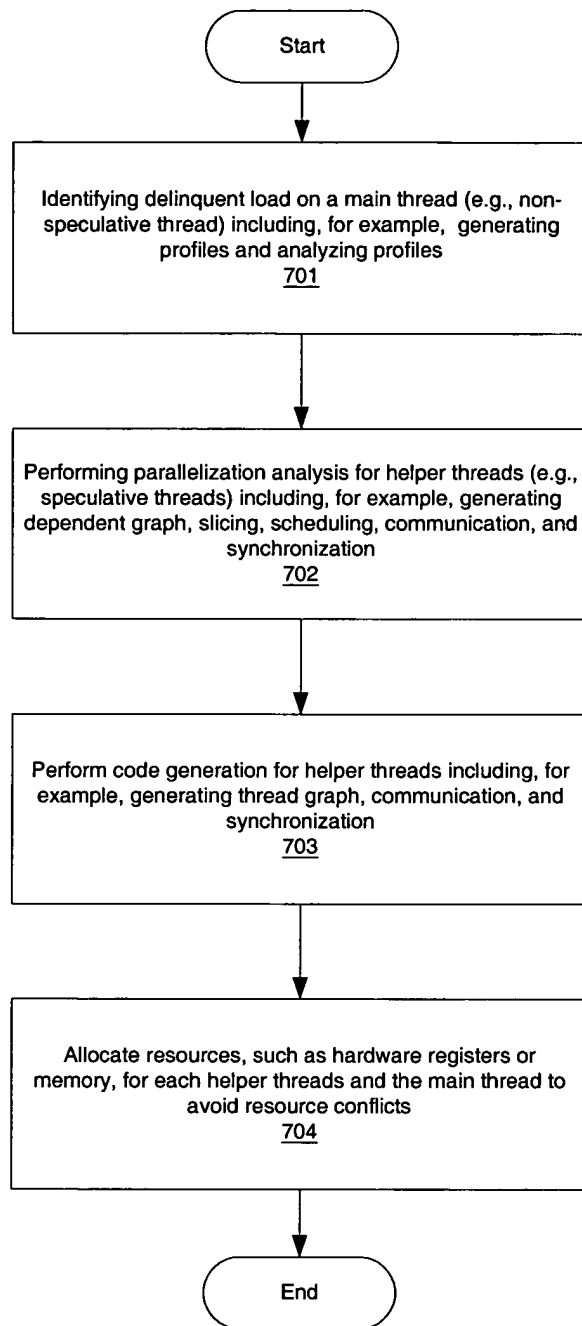
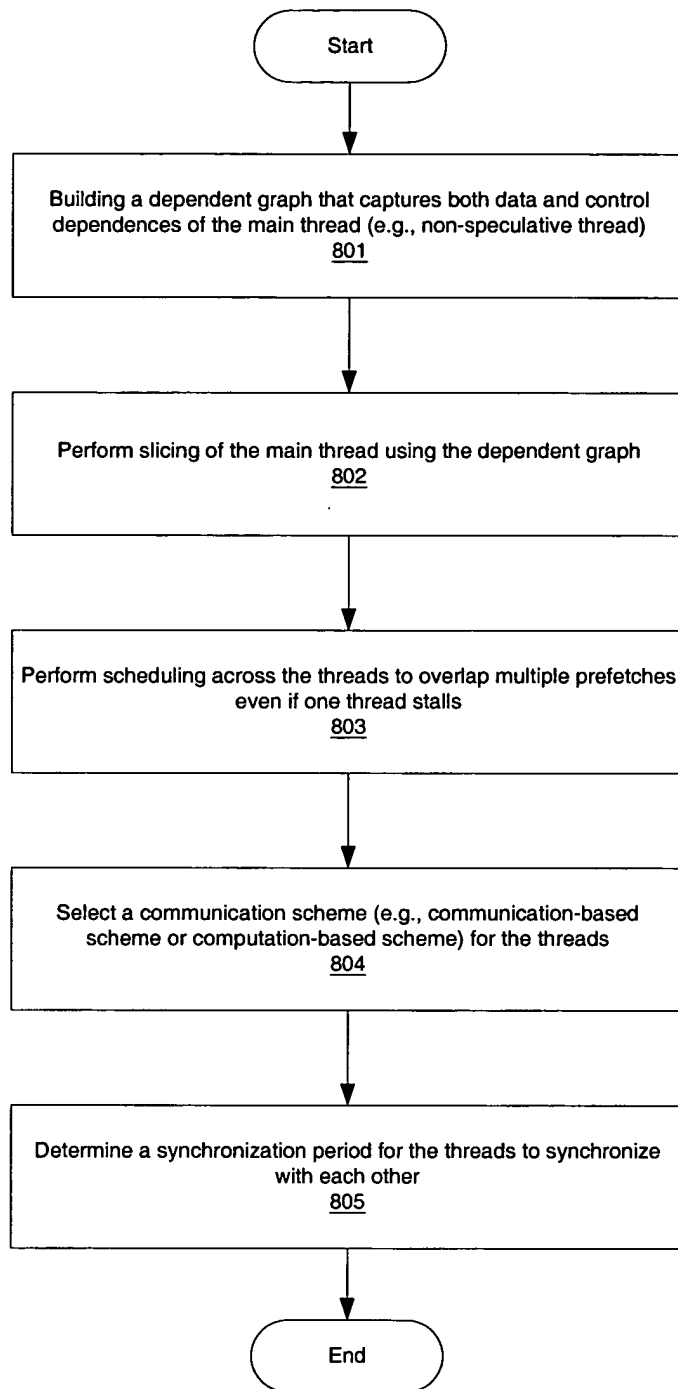


Fig. 5

**Fig. 6**

**Fig. 7**

**Fig. 8**

```

void foo_main(LIST *p)
{
    ....
    { while (p!= NUL:L) {
        ...
        do_work1(p->data1, 10);
        do_work2(p->data2, 20);
        ...
        p= p->next;
    }
}

```

(I) Serial code

901

Fig. 9A

```

void foo_main(LIST *p)
{ mc = X; M=1; _ssp_begin();
  _ssp_spawn_helper(... helper_foo, ...p...);
  while (p != NULL ) {
    do_work1(p->data1, 10);
    do_work2(p->data2, 20);
    mc = mc + 1;
    if (mc > M*X) {
      M++; _ssp_post(helper_tid);
    }
    p= p->next;
  }
  _ssp_end();
}

```

(II) Main thread code

902

Fig. 9B

```

T-entry foo_helper: captureprivate(p)
{ hc = 0; H = 1; local_p = p;
  while (local_p!= NUL:L) {
    non_faulting_load(local_p->data1);
    non_faulting_load(local_p->data2);
    hc = hc + 1;
    if (hc > H*X && hc > mc)
    { H++; _ssp_wait(main_tid); }
    else if (hc <= mc) {
      (hc, local_p, H) = catchup(mc, p, M)
    }
    local_p = local_p->next;
  }
T-ret }

```

(III) Helper thread code

903

Fig. 9C

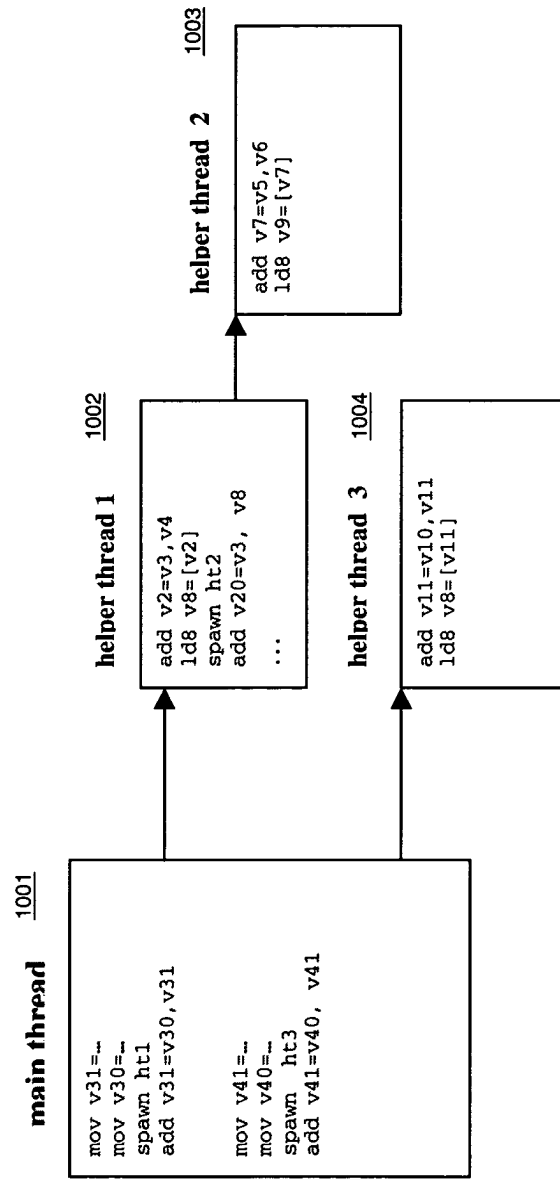


Fig. 10

1100

```
FOREACH THREAD CHAIN
  FOREACH THREAD IN BOTTOM UP ORDER
    READ_RESOURCE_TABLE_FOR_CHILDREN_THREAD();
    PREALLOCATE_REGISTERS();
    ALLOCATE_REMAINING_REGISTERS();
    WRITE_RESOURCE_TABLE ();
  ENDFOR
ENDFOR
1101

FOR MAIN THREAD DO
  READ_RESOURCE_TABLE_FOR_CHILDREN_THREAD_AT_EACH_SPAWN();
  PREALLOCATE_REGISTERS();
  ALLOCATE_REMAINING_REGISTERS();
1102
DONE
```

Fig. 11

1200

Thread ID <u>1201</u>	Written Resources <u>1202</u>	Live-in Resources <u>1203</u>
Helper Thread 2	R4, R5	(V5, R2) (V6, R3)
Helper Thread 1	R2, R3, R4, R5, R8, R9	(V3, R6) (V4, R7)
Helper Thread 3
...
Helper Thread n
Main Thread

Fig. 12

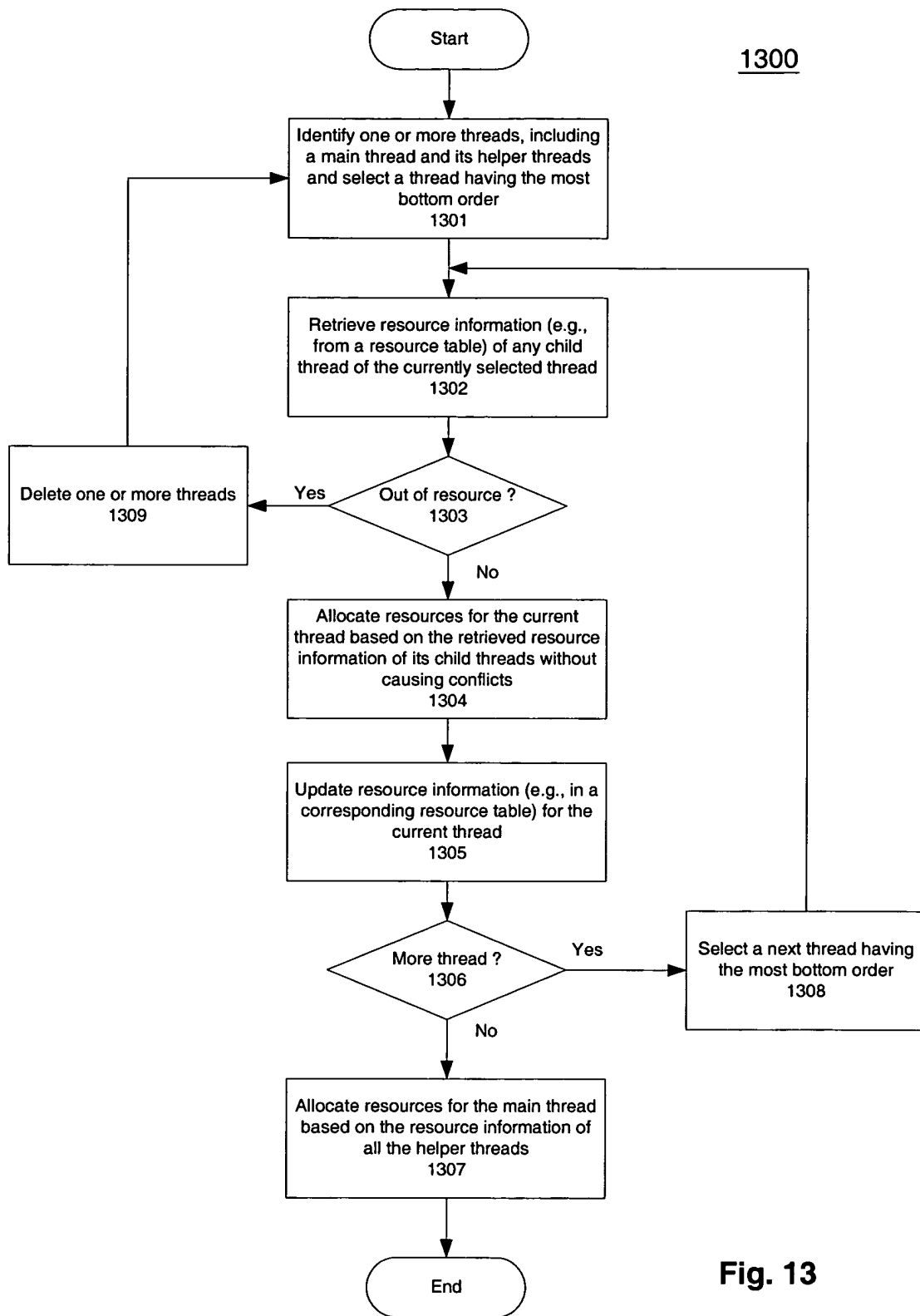


Fig. 13

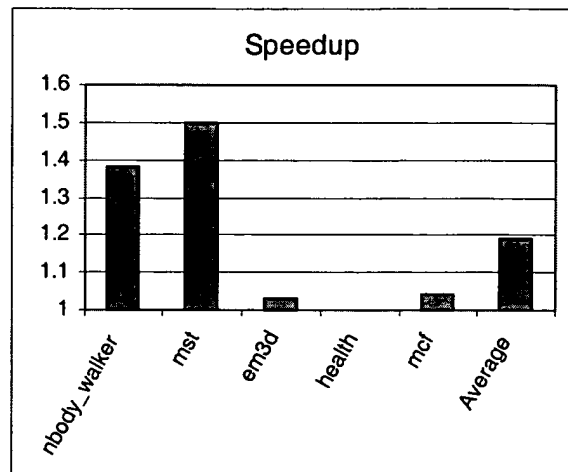


Fig. 14A

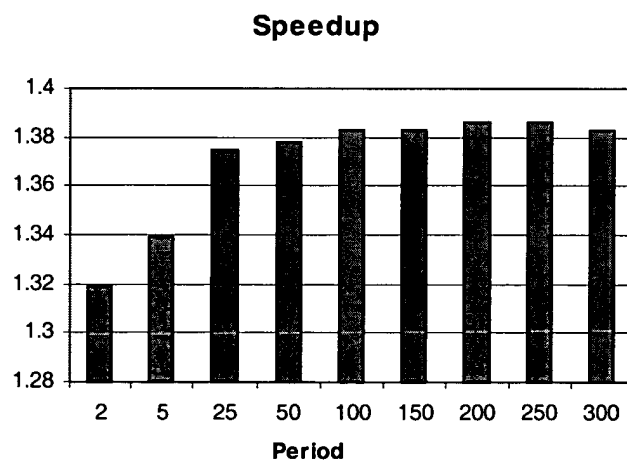


Fig. 14B

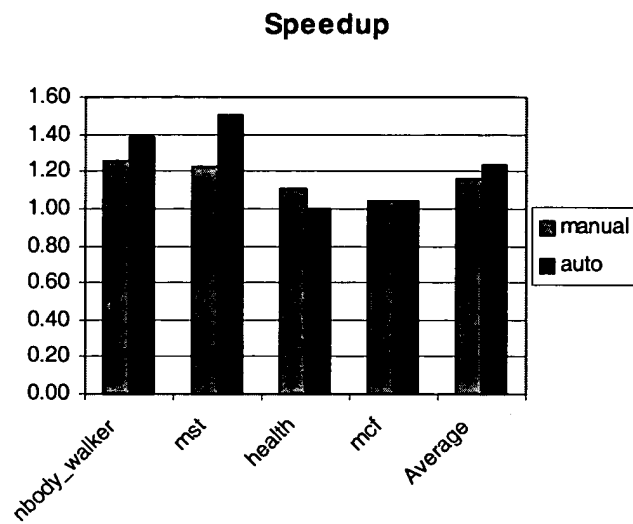


Fig. 14C

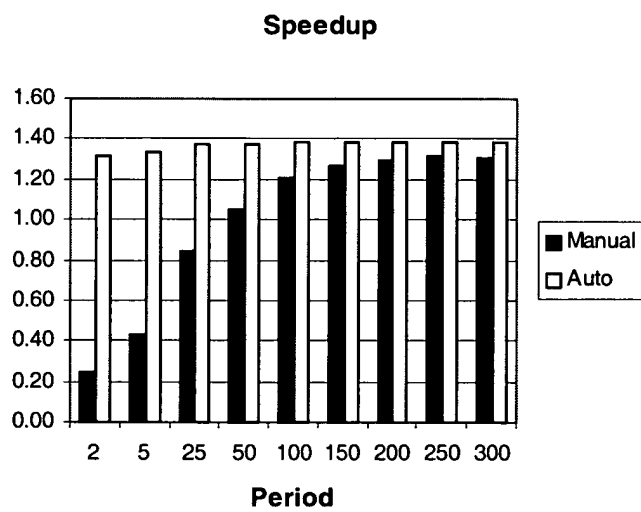


Fig. 14D